United States Department of Agriculture
Natural Resources Conservation Service

Soil Climate Analysis Network (SCAN)

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National Soil Moisture Network Workshop
NOAA Center
Boulder, CO
May 25, 2016

Soil Moisture Monitoring

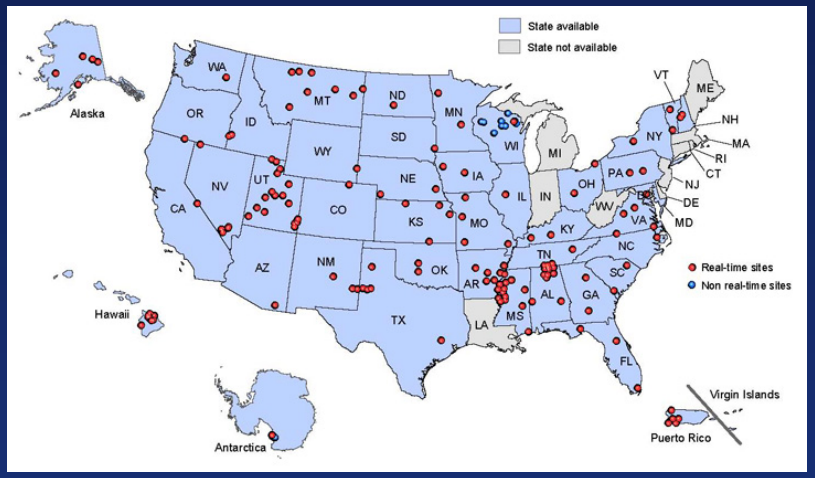
- SCAN
  - Soil Climate Analysis Network
  - Monitors lower elevation areas for climate parameters and soil moisture monitoring nationwide
- SNOTEL
  - SNOw pack TELmetry
  - Monitors high elevation areas for snow water content, climate parameters, and soil moisture in the Western United States
  - A SNOTEL soil climate team was developed to work on products and data editing parameters.

SCAN

- SCAN
  - Started as a Soil Moisture/Soil Temperature Pilot Project between the National Water and Climate Center and the National Soil Survey Center in 1991 with 21 stations in 19 states
  - If funding becomes available, full implementation of SCAN would have at least 1,000 new stations and integrate 1,000 existing partner-based stations
    - Goal will be to have new stations located on Benchmark soil series
  - Utilizes meteor burst, line-of-sight, or GOES satellite communication technology to transmit remote station data

SCAN

- Provides hourly data with
  - Precipitation
  - Air temperature
  - Relative humidity
  - Solar radiation
  - Wind speed and direction
  - Barometric pressure
  - Soil moisture and soil temperature
    - 5, 10, 20, 50, and 100 cm



SCAN Data

- All SCAN stations have full soil characterizations complete and available on the web
- All historic and real-time SCAN data are available on the web
  - http:www.wcc.nrcs.usda.gov/scan
- Special Reports
  - Special “Spreadsheet” compatible reports can be created

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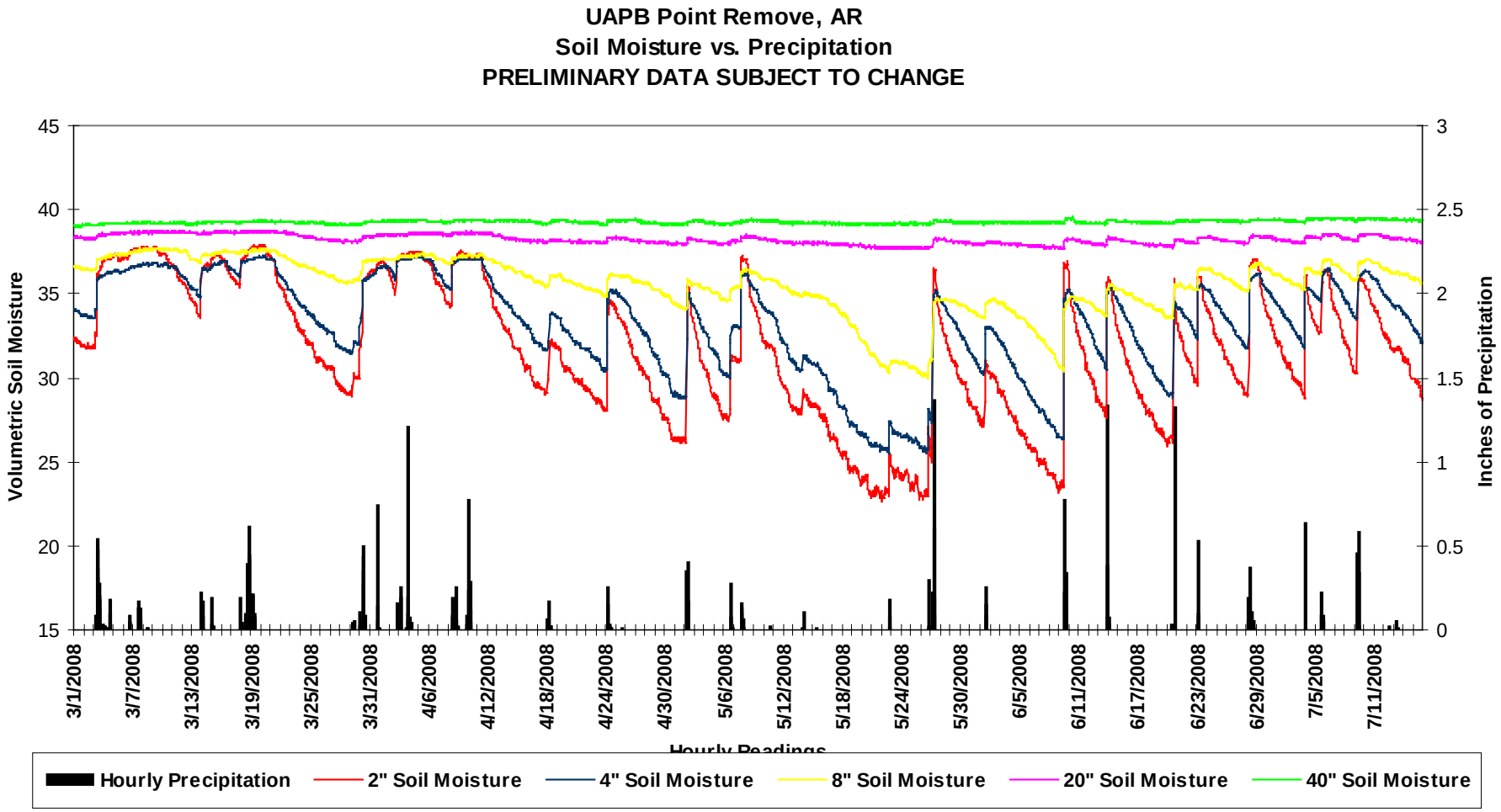
Soil Moisture/ Precipitation



Siting Criteria

- All stations should be located on federal, state, county, or university lands. This will ensure long-term use of the land for monitoring purposes.
- All stations should be located in non-irrigated areas.
- First consideration be given to “Benchmark” soils.
- Consideration must be given to ensure that all Major Land Resource Area’s are represented in a given climatic region.
- The station must represent an agricultural area. Pasture, range, timber, and cropped areas must be considered first.
- When selecting a suitable location, some consideration of station security must be included.
- The first stations to be installed should be located in areas that are susceptible to drought.

Soil Moisture/Soil Temperature Measurement

- NRCS uses a capacitance type of sensor.
- Steven Water “Hydro Probe” SDI-12 is currently used
- Installed at specific depths
- Full soil description and characterization analysis are done at each location
- Description and characterization data available to users from the Web

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Soil Description

Sensor Placement and Layout

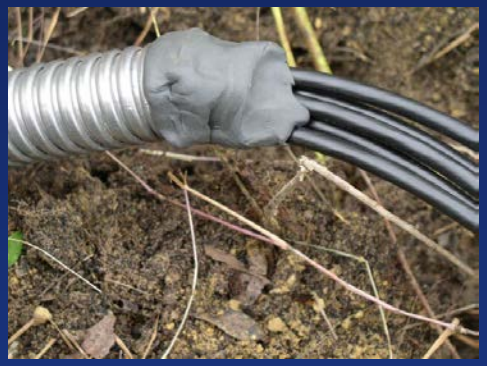
- The deepest sensor is installed first
- 40 inch installed vertically
- Hole is kept to a small size to minimize water transport

Sensor Placement and Layout

- Sensors are placed horizontally at all other depths
- Sensors are dispersed around the small hole to minimize interference
- Compact the soil as each sensor is installed making sure the sensor is inserted completely into undisturbed soil

Sensor Placement and Layout

- Sensor wires are moved to opposite side of hole and form a drip-loop
- Flex-conduit is used to protect sensor wires



Data

- SCAN and SNOTEL Data are retrievable from the web page at http://www/wcc.nrcs.usda.gov
- Soil Pedon Data are retrievable from the web page at http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils

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